



Bernalillo County Fire Marshal's Office

Plans Review and Submittal Requirements

The purpose of this manual is to assist the design professional in understanding the process of the submittal of construction documents, shop drawings, and plans for review to the Bernalillo County Fire Marshal's Office.

Contents

Introduction	2
Certificate of Fitness Requirements	3
Engineer Requirements	4
Electronic Plan Review	5
Paper/Hardcopy Plans and shop drawings	5
Plan Review Fees	5
Fire Alarm and Detection Systems	6
Automatic Fire Sprinkler Systems	8
Design Requirements	8
General Information Required	9
Protection of Exterior Exposed Sprinkler System Components	11
Special Systems	11
Hydraulic Calculations	11
Tenant Improvements	12
Limited Area Sprinkler Systems	12
Storage Occupancies	12
Fire Pumps	15
Water Storage Tanks	16
Backflow Prevention Assemblies	16
Fire Department Connections	17
Fire Hydrants	17
Hydraulic Calculations	18
System Flow Requirements	18
Fire Mains	19
Where required	19
Commercial Kitchen Hoods	20
General Information Required	20
System Annunciation	21
Clean agent fire suppression systems	21
General Information Required	21
System Annunciation	22
Deviations, additions, or deletions from original plans	23

Introduction

It is the mission of the Bernalillo County Fire & Rescue Department to protect lives and property through proactive education, prevention and response.

To accomplish this mission the Bernalillo County Fire Marshal's Office conducts a thorough and comprehensive plan review on new, and existing construction projects in Bernalillo County.

Bernalillo County has adopted the 2009 International Fire Code with local amendments on May 10th 2012. The Fire Code establishes the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life and safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures, and premise and to provide safety to fire fighters and emergency responders.

The Fire Code requires construction documents, shop drawings, plans, and supporting data to be submitted in such form and detail as required by the Fire Marshal. The Fire Marshal shall examine the construction documents, shop, drawings, and plans to ensure that the work indicated and described is in accordance with the requirements of the Fire Code.

The purpose of this manual is to assist the design professional in understanding the process of the submittal of construction documents, shop drawings, and plans for review to the Bernalillo County Fire Marshal's Office.

Certificate of Fitness Requirements

All applicants providing submittals to the Bernalillo County Fire Marshal's Office for any fire protection system including but not limited to;

- Fire Detection System
- Automatic Fire Sprinkler System
- Fire Alarm System
- Commercial Kitchen Hood System
- Special Extinguishing System

will be required to possess a current Certificate of Fitness from the New Mexico State Fire Marshal's Office. Upon receipt of each submittal Fire Marshal's Office Plans Examiners will verify that the applicant has a valid Certificate of Fitness. If it is determined that the applicant requesting review does not possess a valid Certificate of Fitness, the submittal will be denied, and returned until a valid Certificate of Fitness can be obtained.

If your company does not possess a valid Certificate of Fitness from the New Mexico State Fire Marshal's Office, you may contact the State Fire Marshal's Office at (505)827-3728, or online at www.nmprc.state.nm.us/state-firemarshal to obtain an application form.

Please note that expired Certificate of Fitness from the State Fire Marshal's Office, or Certificates issued by other Fire Authorities will not be accepted as substitutes for the required documentation. Failure to provide current Certificate of Fitness information will result in denial of submitted construction documents, shop drawings, or plans.

Engineer Requirements

Fire Protection system plans shall be submitted bearing a review certificate and signature of a Registered Professional Engineer in accordance with NMAC 16 Chapter 39 Part III subsection G “Fire Protection Engineers”. Engineering for fire detection, fire alarm, and fire suppressions systems by a New Mexico licensed professional engineer shall be limited to;

- Those engineers who have been approved by the State Board of Licensure for Professional Engineers and Professional Surveyors to practice in the discipline of fire protection engineering, or
- An engineer who is competent by experience or education in designing such systems and can demonstrate continuing professional competency by attending and reporting sufficient professional development hours including but limited to; fire protection codes and standards.

Construction documents, shop drawings, or plans that have been submitted that do not have an “Engineer Stamp” will be denied. Professional Engineers utilized shall be a Registered Professional Engineer within the State of New Mexico. Professional Engineer stamps from other states and/or jurisdictions will not be accepted. The requirements for a Professional Engineer’s seal are outlined in the Handbook for New Mexico Building Officials. The Handbook can be obtained online at the New Mexico Board of Professional Engineers * Professional Surveyors website at www.sblepes.state.nm.us.

The original design of a fire protection system shall be conducted by a minimum of a National Institute for Certification in Engineering Technologies Level IV Technician, who is an employee of the company contracted to install the perspective system. The design must be reviewed and stamped by a registered professional engineer. The Fire Protection System Contractor shall forward the Engineer’s comments, with the appropriate changes to the Bernalillo County Fire Marshal’s Office at the time of initial submittal.

Electronic Plan Review

Construction documents, shop drawings, and plans submitted to the Bernalillo County Fire Marshal's for review shall be on CD or DVD media in PDF format. Plans shall be designed in accordance with the appropriate NFPA Standard for the system and shall be submitted bearing a review certificate and signature of a New Mexico Licensed Professional Engineer as outlined in the Engineer Requirements on page 4. A Professional Engineer may affix an electronically generated signature and date of signature to the construction documents, shop drawings, or plans provided that the Engineer utilizes a secure method of affixation. Electronic seals and signatures shall be in accordance with the Board of Professional Engineers & Professional Surveyors.

This applies to fire and life safety system plans, automatic fire sprinkler system plans, fire alarm plans, and fire extinguishing system plans. Plans shall be submitted to the Bernalillo County Fire Marshal's Office. Once the plans have been reviewed the submitter shall receive a letter stating if the plans were approved or denied, and will outline any corrections needed to the system.

Paper/Hardcopy Plans and shop drawings

Plans and shop drawings shall comply with the guidelines above, paper or hard copy plans will not be accepted by the Bernalillo County Fire Marshal's Office. Any plans or shop drawings received other than electronic format will be denied and returned to the applicant indicating the reason for disapproval, and requesting that plans and shop drawings shall be submitted electronically.

Plan Review Fees

The Bernalillo County Fire Marshal's Office assesses a plan review fee for all plans that are reviewed by the Office. A permit shall not be issued until the fees have been paid, nor shall an amendment to a permit be released until the appropriate fees have been paid in full. Any person who commences any work, activity or operation regulated by the Fire Code before obtaining the necessary permits shall be subject to an additional fee, which shall be in addition to the required permit fees. The fees for plan review are as follows;

Plan Review Fees:

- Initial Submittal* \$100.00
 - Re-submittal \$100.00
- *initial plan review includes one re-submittal

Automatic Sprinkler System Plans

- 0-10,000 SQFT \$75.00
- 10,001 to 52,000 SQFT \$125.00
- Each additional 52,000 SQFT \$125.00 or fraction thereof

Special Extinguishing Systems

- 0-5,000 SQFT \$50.00
- Additional 5,000 SQFT \$25.00
- Kitchen Hood \$50.00

Stand-Pipe Systems

- 4 outlets \$50.00
- Each additional or fraction thereof \$50.00

Fire Alarm System

- Up to 10,000 SQFT \$50.00
- 10,000 to 25,000 SQFT \$75.00
- each additional 25,000 or fraction thereof \$75.00

Fire Alarm and Detection Systems

Construction Documents shall be of sufficient clarity to indicate the location, nature, and extent of work proposed and show in detail that it will conform to the provisions of the Fire Code, and NFPA. The original design of a fire protection system shall be conducted by a minimum of a National Institute for Certification in Engineering Technologies Level IV Technician, who is an employee of the company contracted to install the perspective system. The design must be reviewed and stamped by a registered professional engineer. The Fire Protection System Contractor shall forward the Engineer's comments, with the appropriate changes to the Bernalillo County Fire Marshal's Office at the time of initial submittal. Shop drawings for fire alarm and detection systems shall be submitted for review and approval prior to system installation, and shall include but not limited to, all of the following:

1. Name and Address of the building or facility
2. Bernalillo County Building permit number if applicable
3. Name and Address of installing contractor
4. Occupancy Classification per the 2009 International Fire Code
5. Site Plan, if more than one building is being covered by the system
6. A scaled floor plan that indicates the use of all rooms
7. Indicate if the facility is protected by an automatic fire sprinkler system.
8. Locations of alarm-initiating devices
9. Locations of alarm notification appliances, including candela ratings for visible alarm notification appliances.
10. Location of fire alarm control unit, transponders, and notification power supplies
11. Annunciators
12. Source of primary and secondary power
13. Battery calculations
14. Conductor type and size
15. Voltage drop calculations
16. Manufacturer's data sheets indicating model numbers and listing information for equipment, devices, and materials
17. Details of ceiling height and construction
18. The interface of fire safety controls
19. Classification of the supervising station
20. A remote annunciator panel is required in the fire sprinkler riser room
21. Labeling of all fire alarm control panels, annunciator panels, digital alarm communications, or other off-site premise reporting devices and services
22. Location of all means of egress, such as exits, emergency means of egress windows, and areas of refuge
23. Elevator shafts or dump waiter shafts also include any vertical or horizontal open spaces that may be used for other purposes.
24. Type and classification of fire alarm system wiring
25. Zone schedule (multi-zoned systems) for non-addressable fire alarm control panels
26. Description and listing of special supervisory or monitoring devices
27. Shall provide a single line riser diagram for devices on the fire alarm system for:
 - a. Initiating devices
 - b. Indicating devices
 - c. Elevator recall

Plans Review and Submittal Requirements

- d. Door hold open functions
 - e. Special locking devices
 - f. HVAC controls
28. Fire suppression and extinguishing equipment shall be monitored by the fire alarm system
 29. All HVAC and duct detection devices shall be monitored by the fire alarm system
 30. HVAC units that are rated over 2,000 CFM shall require duct detection. Verification of the rating of the HVAC system.
 31. Other systems such as water supply tanks, fire pumps, generators, and other essential equipment shall be monitored by the alarm system
 32. Smoke removal systems shall be activated or monitored as required by applicable NFPA codes.
 33. The following are mandatory installation requirements for all fire alarm systems
 - a. A dedicated electrical service is required for all main fire alarm control panels. This includes all-remote, sub-panels, and power boosters
 - b. A protective guard is required to be installed on the electrical circuit breaker for the main fire alarm control panel and all sub-panels.
 - c. Identification or labeling of the circuit breakers for the main fire alarm control panel and sub-panels is required in the electrical circuit breaker panel.
 34. The overall design, installation, and components of the fire alarm system shall meet the requirements of NFPA 72. The Bernalillo County Fire Code, references the most current edition of the NFPA codes and standards.
 35. If the Fire Alarm Control Panels are installed in closets, IT rooms, basements, or other ancillary rooms, a Remote Annunciator Panel shall be installed in the facility lobby, reception area, or office, where it is attended by staff during normal business operation.
 36. The Seal and signature from a New Mexico Registered Professional Engineer.
 37. Where field conditions necessitate any substantial changes from the approved plans, a set of corrected plans shall be submitted for review and approval.

Final Inspection/Acceptance Test

Once the fire alarm or detection system has been installed, a final inspection shall be required prior to the building be occupied. The following need to be available for review at the time of the final inspection,

- A “Record of Completion” in accordance with NFPA 72 National Fire Alarm Code, Chapter 1, Section 1.7.2.1
- A set of “as built” plans along with the plans approved by the Fire Marshal’s Office.

The acceptance test involves testing of the initiating devices, the control panels, and other appliances of the system to ensure they are working properly, and they have been installed in accordance with NFPA, the Fire Code, and the approved plans. Acceptance Testing of smoke detectors shall be conducted using “test smoke”.

Automatic Fire Sprinkler Systems

An automatic fire sprinkler system shall be installed throughout all levels of new group A, B, E, F, H, I, M, R, S, and U occupancies more than 6, 000 square feet.

Construction documents for fire protection systems shall be of sufficient clarity to indicate the location, nature, and extent of the proposed work, and show in detail that it will conform to the provisions of the Bernalillo County Fire Code, the International Fire Code and the appropriate NFPA standard.

Construction documents for fire protection systems shall be submitted for review and approval prior to installation. Automatic Fire Sprinkler systems shall be designed in accordance with NFPA 13, NFPA 13D or NFPA 13 R whichever is applicable, and shall be submitted bearing a review certificate and signature of a New Mexico Licensed Engineer as outlined in NMAC Title 16 Chapter 39 Part III subsection G “Fire Protection Engineers”. The Automatic Fire Sprinkler Contractor shall forward the Engineer’s comments, with the appropriate changes to the Bernalillo County Fire Marshal’s Office at the time of initial submittal

Design Requirements

A minimum of one (1) copy of the construction documents or shop drawings along with appropriate calculations and submittal data shall be provided to the Bernalillo County Fire Marshal’s Office following the electronic submittal guidelines on page 5.

Construction documents or shop drawings shall clearly indicate the design standard(s) and edition used to prepare the submission. Systems shall be designed in accordance with the most recently published NFPA standard as referenced in the 2009 International Fire Code, and the Bernalillo County Fire Code. Automatic Fire Sprinklers shall be designed based on the hazard classification of the building in accordance with NFPA 13. Automatic Fire Sprinkler Systems designed for high piled storage shall be in accordance with Chapter 23.

Automatic sprinkler protection shall be extended into attached exterior storage closets in Group R-1 and R-2 occupancies protected by an automatic sprinkler system in accordance with NFPA 13R.

Attached garages, carports, and balconies with living space directly above or adjacent to shall be provided with sprinkler protection, open patios or balconies with living space directly above or adjacent to shall be provided with sprinkler protection.

An exterior door leading directly into the room containing the fire sprinkler riser and shut off controls shall be provided.

A minimum of a four-inch (4”) underground water main is required for NFPA 13 and NFPA 13R systems. The fire line from the control valve at the main to the flange within the building shall be constructed of ductile iron pipe (350) unless otherwise permitted by the Fire Code Official.

Sprinkler systems for NFPA 13, 13R, and 13D systems shall be designed with a minimum safety factor as follows:

1. When the static pressure exceeds 90 psi the maximum design static pressure shall be 80 psi regardless of actual test pressure. The slope of the original water supply curve shall be used even though the design pressure is reduced to 80 psi.
2. The actual flow test pressure shall be used to determine the need for sizing fire pumps, pressure reducing valves, and hanger requirements in accordance with NFPA 13, 13D, and 13R.
3. When the static pressure is less than 90 psi a minimum 10 psi safety factor shall be provided between the available water supply and the system flow and pressure demand and shall include hose stream allowances required by NFPA 13, 13D, and 13R.

Speculative Warehouses shall comply with the 2009 edition of the International Fire Code Chapter 23 as amended by Bernalillo County. A Speculative Warehouse is a building designed for high piled combustible storage without a known commodity designation specified. Where the maximum allowable storage height can exceed 12 feet but less than 22 feet the following shall apply:

1. Design for a Class IV non-encapsulated commodity, double row rack storage, 8 foot aisles and 286 degree sprinklers; and
2. Hydraulically design to protect the maximum possible clear height or storage without in-rack sprinklers; and
3. Add 500 G.P.M. at the base of the riser for inside hose to hydraulic calculations, and provide the hose stub outs for future installation or use existing columns for hose installing locations.
4. Where the maximum allowable storage height can exceed 22 feet the following shall apply:
5. Hydraulically design system to protect the maximum possible clear height of storage without in-rack sprinklers; and
6. Provide .64 G.P.M. per square foot over the hydraulically most remote 2,000 square feet; or use an approved alternative design such as ESFR sprinklers

General Information Required

The Following is the minimum information is required for plans submittal for automatic fire sprinkler systems.

1. Project Name
2. Physical Address.
3. The Bernalillo County Building permit number if applicable
4. Name and owner and/or occupant
5. Tenant space designation and labeling
6. The Designer's name, address, and telephone number

7. Drawings shall clearly indicate the total square footage of the project, per floor or area protected by each system riser.
8. The number of sprinkler heads in the project to include:
 - a. Type of sprinklers
 - b. K factors
 - c. Temperature rating
 - d. Coverage area
 - e. Minimum operating pressure
 - f. Orifice size
9. Equipment symbol legend
10. Drawings shall be drawn to a common scale and information shall be legible. Drawings and calculations shall clearly show a floor plan of each story, indicating the location of walls, partitions, fire rated assemblies, and the intended use of each area, room, or void space.
11. Plot plans showing the water supply connection, pipe diameters, lengths, and fittings to the building
12. Building dimensions, cross sectional views, and location of partitions
13. Type of protection for nonmetallic pipe
14. Dimensions for system piping, type of pipe, and component spacing
15. Sprinkler riser detail shall include spare sprinkler head box.
16. Schematic drawings of the fire protection underground shall include the following;
 - a. Point of entry into the building
 - b. Size and length of pipe
 - c. Point of connection to the Water Authority' main and reference flow test location
 - d. Locations and types of valves, meters, backflow prevention devices
 - e. Location of water supply sources, other than Water Authority's mains. (Storage tanks, wells, etc.)
17. Drawings shall clearly indicate the type and location of the following;
 - a. Control valves
 - b. Test valves
 - c. Drain valves
 - d. Alarm devices
 - e. Hose outlets
 - f. Fire Department Connections
 - g. Inspector's test lines
 - h. Fire Hydrants
18. Drawings shall clearly indicate the location of special sprinklers (i.e. extended coverage, sidewalls, intermediate/high temperature sprinklers)
19. Drawings shall clearly indicate, pipe types, and wall thickness, type of fittings and joints, the type and location of hangers, sleeves, braces, and methods to support sprinkler components.

Protection of Exterior Exposed Sprinkler System Components

Protection for exterior exposed sprinkler system components shall be as follows:

1. Sprinkler pipe and components located on the exterior of a building shall be either galvanized or painted to protect from corrosion.
2. Sprinkler pipe other than steel smaller than 2-inches in diameter and installed in unheated areas shall be insulated to protect from freezing. Providing insulation on any exterior piping part of the sprinkler system or its supply smaller than 2 inches in diameter is an allowable alternative.
3. Hydraulic design information signs shall be metal with the information maintained clearly and permanently stamped onto the sign.

Special Systems

1. Drawings shall clearly indicate the make, type, model, and size of dry pipe, pre-action, or deluge valves,
2. Drawings shall clearly indicate the water capacity in gallons of each dry pipe system.
3. Drawings shall clearly indicate air pressure settings for valves and supervisory air functions at normal and abnormal conditions.
4. Drawings shall clearly indicate the location of pressure gauges
5. Drawings shall clearly indicate the compressor capacity, compressor piping system, and check- relief valves.

Hydraulic Calculations

Hydraulic calculations shall be prepared on form sheets that include a summary sheet, detailed worksheets, and a graph sheet. The calculation summary sheet shall include the hazard classification. When multiple design densities are required to protect various hazards within a common system area, separate calculations shall be provided for each hazard area.

The Calculation summary sheet shall include the following;

1. Design density and total design area (example: 15gpm/ft²/1500 ft²)
2. Maximum area of coverage per sprinkler
3. Total system demand at base or riser water for inside and outside hose streams shall be represented as actually provided
4. Minimum safety margin as outlined on pages 8 and 9.
5. A graphic representation of the hydraulic demand shall be plotted on graph paper or computer generated hydraulic program based upon
 - a. Water flow data (dated within one (1) year of drawing submission).
 - b. Total sprinkler system hydraulic demand including hose systems.
6. Friction loss through pipes and fittings shall be determined using the Hazen-Williams formula or other approved hydraulic formula. The Hazen-Williams formula is as follows:

$$P = \left(\frac{4.52 \times Q^{1.85}}{C^{1.45} \times D^{4.87}} \right)$$

Plans Review and Submittal Requirements

Where:

P= Friction Loss in psig per foot of pipe

Q= Flow in GPM

C= Hazen-Williams co-efficient of roughness, friction loss co-efficient, pipe roughness co-efficient

D= Actual internal diameter of pipe in inches

Tenant Improvements

Where an existing system(s) are to be modified, sufficient details of the existing system shall be shown on the plans to determine the effect of the proposed modification on the total system.

1. Provide a complete floor plan of the building indicating the start and the end of the modification.
2. Drawings shall clearly indicate the location and floor level of the hydraulic remote area and its design criteria.
3. Work being performed in the hydraulic remote area shall include hydraulic calculations utilizing water flow test results. This applies to modifications of twenty (20) heads or more only.
4. When the pipe schedule method is to be used to determine water demand requirements, all aspects of the pipe schedule method of NFPA 13 shall be applied.

Limited Area Sprinkler Systems

1. Provide a key plan showing the room or space to be sprinkled. Provide location in the building and room number(s), floor, etc.
2. Provide hydraulic calculations; including domestic water demand if sprinkler is supplied through a common meter in accordance with NFPA 13.

Storage Occupancies

When there is exterior storage of combustible or hazardous materials the required fire flow to protect exterior storage shall be determined by an engineering analysis. If the fire flow required to protect exterior storage exceeds the fire flow required to protect the building, the higher fire flow shall be used.

Speculative Warehouses shall comply with the 2009 edition of the International Fire Code Chapter 23 as amended by Bernalillo County. Where the maximum allowable storage height can exceed 12 feet but less than 22 feet the following shall apply:

1. Design for a Class IV non-encapsulated commodity, double row rack storage, 8 foot aisles and 286 degree sprinklers; and
 2. Hydraulically design to protect the maximum possible clear height or storage without in-rack sprinklers; and
 3. Add 500 G.P.M. at the base of the riser for inside hose to hydraulic calculations, and provide the hose stub outs for future installation or use existing columns for hose installing locations.
 4. Where the maximum allowable storage height can exceed 22 feet the following shall apply:

5. Hydraulically design system to protect the maximum possible clear height of storage without in-rack sprinklers; and
6. Provide .64 G.P.M. per square foot over the hydraulically most remote 2,000 square feet; or use an approved alternative design such as ESFR sprinklers

The design of an automatic sprinkler system for client leased or occupant owned buildings containing high piled storage shall be based on the requirements of NFPA 13. The responsible fire protection engineer shall perform a survey of the building to determine commodity classification, storage configuration, building height, and other information related to the development of an appropriate sprinkler system design. The engineer shall also make reasonable efforts to meet with the building owner or operator to understand seasonal or customer related fluctuations to the stored commodities, storage height, and configuration.

The sprinkler design shall be based on the most demanding requirements determined through the onsite survey and discussions with the building owner or operator. A technical report shall clearly define the basis for determining the commodity and sprinkler design selection along with how the commodities will be isolated or separated, and the referenced design documents including NFPA 13 or the current applicable Factory Mutual Data Sheets. If a specific fire test is used as the basis of design, a copy of the fire test report shall be provided at the time of the plan review.

In addition to the requirements of NFPA 13, the following information shall be included in the plans or technical report.

Class I-IV and Group plastic commodities

1. An owner certificate in accordance with NFPA 13. The design criteria e.g. NFPA 13, Factory Mutual Date Sheet, or a specific fire test report.
2. A water supply flow and pressure test report
3. The type of design e.g. Control Mode Density/Design Area Method, Specific Application Control Mode Method, Suppression Mode Method, including the appropriate code references.
4. A description of the stored commodities and how the commodity classification was determined.
5. A layout of the proposed storage arrangement. If the storage is in racks, a plan and elevation detail illustrating rack heights, flue dimensions and arrangements. This detail is not required for speculative warehouses.
6. The aisle dimensions between each storage array.
7. If a high challenge commodity is separated using fire-resistive construction, the boundary of the fire-resistive construction shall be illustrated.
8. A data sheet for the backflow preventer. If a data sheet is not available, the design professional shall include a statement addressing the minimum required pressure loss.
9. A data sheet for each installed automatic sprinkler
10. A data sheet for each pipe hanger used to hang or support the sprinkler piping
11. If a pump will be installed or used, the manufacturer's factory test curve shall be included in the submittal.
12. A cross section view illustrating obstructions to the ceiling sprinklers e.g. lights, structural members, cable trays, electrical bus ducts, and HVAC ductwork.

Hazardous materials

the following information shall be included in a hazardous materials technical report.

1. A hazardous materials inventory statement
2. For flammable and combustible liquids, and analysis of the miscibility of Class I liquids, the size and type of the packaging, the packaging materials and construction, and if the containers have a pressure relieving mechanism.
3. For Level 2 or 3 aerosols, a statement indicating whether the aerosols are cartooned or un-cartooned.

An adhesive label shall be permanently installed at or adjacent to each sprinkler riser. When a building contains more than four risers the sign shall be located in an approved location inside the building. When the sprinkler riser is located outside of the building, the sign shall be stamped metal. The minimum sign dimension is 6 inches high by 4 inches wide. The sign shall specify the capabilities and limitations of the automatic sprinkler system. The sign shall include the following information: (see figure 2306.4.7)

1. The basis for design including the edition used
2. A statement indicating if the sprinkler design is control mode density method, control mode specific application, suppression mode, or any combination thereof.
3. If NFPA 13 for special design is used then list all of the storage conditions.
4. The maximum storage height
5. The minimum required aisle width
6. If storage racks, the maximum rack width and minimum transverse and longitudinal flue widths.
7. Commodities that can be protected by the automatic sprinkler system
8. Commodities that cannot be protected by the automatic sprinkler system
9. Limitations on the storage height of idle wood and plastic storage
10. Limits on storage heights of miscellaneous Group A plastics, tire and rolled paper.
11. Locations where in-rack sprinklers are required
12. Locations where horizontal and vertical barriers are required
13. Information explaining the manufacturer sprinkler identification number, k-factor, and operating temperature of the overhead sprinklers protecting high piled storage.

Figure 2309.4.7

Automatic Sprinkler System Capabilities & Limitations	
Stored Commodity	Class I water miscible flammable liquids in 1 & 5 gallon polyethylene containers in cardboard
Design Documents	NFPA 13 2007 edition & NFPA 30 2007 edition, Table 4.8.2(g) and section 4.8.6.2 (scheme B)
Design Type	Control Mode, Density /Area Method
Max. Storage	25 feet
Height	
Min Aisle	8 feet
Width	
Width Flue	Longitudinal min. 6 inches

Fire Pumps

If a proposed project is to include a fire pump which supplies the system with adequate fire flow the manufacturer's specification on the fire pump must be submitted with the shop drawings. The information shall include all pertinent technical data in regards to operation, installation and flow ratings to include the following;

1. A copy of the factory pump test curve
2. Pump GPM rating
3. Driver, pump, and controller manufacturer, respective models, and driver type

Where an automatic sprinkler system has a fire pump, the drawings shall include;

1. Cross sectional view of installed equipment
2. Room dimensions
3. Equipment symbol legend
4. Suction pipe flushing requirements

Plans Review and Submittal Requirements

5. Connection to the water supply including the pipe diameter and the pipe routing; including any elevation changes
6. Details of the pressure gauge installed near the discharge casting
7. A compound and vacuum pressure gauge are detailed on the suction pipe
8. An automatic relief valve
9. If used the operating angle of a flexible connection shaft
10. The coupling guards for the flexible connection shaft between the pump driver and pump
11. Size and type of pump suction and discharge pipe
12. Steel pipe size for aboveground pipe.

Fire Pump installation shall meet the requirements of NFPA 20 *Installation of Stationary Pumps for Fire Protection*.

Water Storage Tanks

If the proposed system requires an on-site storage tank for fire protection the manufacturer's specifications of all water tanks to be used within the proposed system shall be included with the shop drawings. All technical data pertinent to the storage tank shall be included. Failure to include this information will result in rejection of the submittal.

Water storage tanks for private fire protection shall be installed in accordance with ***NFPA 22 Standard for Water Tanks for Private Fire Protection***.

Private fire service mains and appurtenances shall be installed in accordance with ***NFPA 24 Standard for the Installation of Private Fire Service Mains and Their Appurtenances***.

Backflow Prevention Assemblies

The potable water supply to automatic sprinkler and standpipe systems shall be protected against backflow as required by the New Mexico Plumbing Code, and the Albuquerque Bernalillo County Water Authority.

The pressure loss through any backflow prevention assembly installed on the system shall be included in the hydraulic calculations. The model and size of the backflow prevention assembly shall be noted on the plans.

The manufacturer's specifications of the backflow prevention assemblies installed on a fire sprinkler system shall be included with the submittal of the fire sprinkler system shop drawings. All technical data pertinent to the devices shall also be included.

All above ground backflow prevention assemblies devices shall be provided with tamper switches, which sound an alarm to the main fire alarm control panel, on a supervisory or trouble signal. Additional, backflow prevention assemblies accessible to the public shall be chained and locked in the open position.

Fire Department Connections

Fire department connections shall be installed in accordance with the NFPA standard applicable to the system design. The minimum size of a fire department inlet connection shall be 2 ½ inches with National Hose Thread (NH).

The number of inlets for fire department connections shall be based on the sprinkler system based on the riser demand with 500 GPM allowed for each fire department inlet connection.

All fire department connections underground piping shall be constructed of ductile iron pipe (350) unless otherwise permitted by the Fire Marshal's Office.

Location

Fire Department Connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus. The location of the fire department connection shall be remotely located at a distance of not less than 1 ½ times the height of the tallest wall. A site plan detail shall be submitted with the sprinkler system shop drawings.

Fire department connections shall be located on the street side of buildings, fully visible and recognizable from the street or nearest point of fire department vehicle access or as otherwise approved by the Fire Marshal. The location of the fire department connections shall be approved and installed as follows:

- So that hose lines can be readily attached without interference from any nearby objects, including fences, parked vehicles, posts, signage, or plats.
- Within 200 feet of an approved hydrant
- So that the inlet height shall not be less than 18 inches or more than 48 inches above grade.
- Guard posts or other means are required to protect the fire department connection from vehicular damage. When guard posts are installed, the posts shall be installed in accordance with the 2009 edition of the International Fire Code, Chapter 5.

Immediate access to fire department connections shall be maintained at all times and without obstruction by fences, bushes, trees, walls, mechanical equipment, retention ponds, or any other fixed or moveable object. A minimum of three (3) feet clearance shall be maintained around fire department connections. Access to fire department connections shall be approved by the Fire Marshal.

Fire Hydrants

An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, building, or portions of buildings are constructed or moved into within Bernalillo County. Water Supplies shall be in accordance with the 2009 edition of the International Fire Code Appendix B, and the Bernalillo County Fire Code. A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

Plans Review and Submittal Requirements

Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official.

Plans, hydraulic calculations, and specifications shall be submitted to the Bernalillo County Fire Marshal's Office for review and approval prior to the installation of on-site water supply systems. Underground fire main systems shall be installed in accordance with NFPA 24, Private Fire Service Mains, and their Appurtenances. Water tanks shall be installed in accordance with NFPA 22 Water Tanks for Private Fire Protection. Fire Pumps shall be installed in accordance with NFPA 20 Standards for Water Tanks for Private Fire Protection.

Exception: Public water distribution mains approved by the Albuquerque Bernalillo County Water Authority.

Fire hydrants to be installed on-site of a given project shall be clearly indicated on the site plan. Locations shall be shown in relation to the location of the fire department connection, and shall also include the fire flow information for the protected premises.

When a water supply for fire protection is not available from the Albuquerque Bernalillo County Water Authority or if the flow rate, pressure, or duration of the water supply available from the Water Authority does not meet the requirements of this code, the owner shall be responsible for installing all of the infrastructure required to meet the fire flow requirements of the Bernalillo County Fire Code and the International Fire Code 2009 edition.

Fire hydrant systems and fire hydrants shall be in accordance with Section 507.5 of the Bernalillo County Fire Code. The installation of fire mains and fire hydrants in the public right-of-way shall also meet the Water Authority's specifications. Fire hydrants shall be located not less than 1 foot and not more than 6 feet from the back of the curb of the access road or other vehicle access point. The 4 inch fire department connection shall be perpendicular to the fire apparatus road or fire lane and shall face the access road or fire lane.

Hydraulic Calculations

Hydraulic Calculations shall be submitted to verify the private fire service mains will provide the minimum required fire flows determined by Section 507.2 to the hydraulically most demanding on-site hydrants with the water supply that is available to the system.

System Flow Requirements

The minimum flow rate shall be calculated using 1000 GPM increments starting at the hydraulically most depending hydrant. An additional 1000 GPM or remaining of the required fire flow, or as determined in Section 507.2 shall be added to each successive hydrant until the minimum required fire flow has been accounted for.

A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow. Components of such installations are required to be listed and approved for the intended use, and installed in accordance with the appropriate nationally recognized standards.

Fire Mains

Fire mains and appurtenance shall be sized to accommodate the calculated fire flow, but shall not be less than 6 inches in diameter. Dead-end fire mains shall not be less than 8 inches in diameter unless calculations determine otherwise. Private fire mains shall meet NFPA 24

Where required.

Fire hydrants shall be placed in locations approved by the Fire Code Official and as required in this section. Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants capable of supplying the required fire flow shall be provided where required by the Fire Code Official. Additional fire hydrants may be required when buildings are equipped with fire department connections.

Exceptions:

1. For single family dwellings, the distance requirement shall be 500 feet.
2. For buildings equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 500 feet.

Fire Protection in Recreational Vehicle, Mobile Home, and Manufactured Housing Parks, Sales Lots, and Storage Lots

Recreational vehicle, mobile home, and manufactured housing parks, sales lots, and storage lots shall provide and maintain fire hydrants and fire department access roads in accordance with Section 503 and 507.

First Hydrant Location

The first new fire hydrant shall be located at the street intersection or at the main entrance into a subdivision, apartment complex, or commercial development. Additional fire hydrants shall be spaced per section 507.5.2.5

Parking areas

In open air on-grade parking areas, at least one fire hydrant shall be located within 600 feet of all areas.

Distance to Fire Department Connection

At least one fire hydrant shall be located within 200 feet of a fire department connection supplying building fire protection systems. The distance between the fire hydrant and the FDC shall be measured along the path of fire apparatus access road and as fire fighters would lay hose.

Hydrant Spacing

Fire hydrants shall be spaced a maximum of 500 feet apart in single family residential developments, and shall be spaced a maximum of 300 feet apart in all other developments. The distance between fire hydrants shall be measured along the path of fire apparatus access road.

Commercial Kitchen Hoods

Fire-extinguishing equipment for the protection of grease removal devices, hood exhaust plenum, and exhaust duct systems shall be provided. Cooking equipment that produces grease-laden vapors and that might be a source of ignition of the grease in the hood, grease removal device, or duct shall be protected by fire-extinguishing equipment.

Construction documents for fire protection systems shall be of sufficient clarity to indicate the location, nature, and extent of the proposed work, and show in detail that it will conform to the provisions of the Bernalillo County Fire Code, the International Fire Code and the appropriate NFPA standard.

Construction documents for fire protection systems shall be submitted for review and approval prior to installation. Commercial Kitchen Hoods shall be designed in accordance with NFPA 12, NFPA 96, NFPA 17 or NFPA 17A whichever is applicable, and shall be submitted bearing a review certificate and signature of a New Mexico Licensed Engineer as outlined in NMAC Title 16 Chapter 39 Part III subsection G “Fire Protection Engineers”. The Commercial Kitchen Hood Contractor shall forward the Engineer’s comments, with the appropriate changes to the Bernalillo County Fire Marshal’s Office at the time of initial submittal

General Information Required

Commercial kitchen hood extinguishing systems plans shall be drawn to scale. The drawings shall contain sufficient detail to enable the Bernalillo County Fire Marshal’s Office to evaluate the hazard or hazards and to evaluate the effectiveness of the system. The plans shall include the complete name, address, and NMSFMO Certificate of Fitness number of the Contractor/Designer. The following is the minimum requirements for submittal of commercial kitchen hood extinguishing systems.

- Plans shall clearly indicate the system manufacturer, model number, and sizes of cylinders.
- Plans shall clearly indicate the description and measurements of appliances to be protected
- Plans shall clearly indicate the measurements of the hood, plenum, and duct
- Plans shall clearly indicate the pipe size, length for supply, branches, and if applicable the equivalent pipe length of fittings
- Plans shall clearly indicate pipe volumes with calculations
- The fuel and/or power shutoff device shall be clearly described and detailed
- Plans shall clearly indicate and show the number and type (in degrees F°) of all fusible links
- Plans shall clearly indicate and show the number, type, and aggregate flow rate of nozzles.
- Plans shall clearly indicate and show a 16” space between fryers, and open flame appliances.

Plans Review and Submittal Requirements

- Plans shall clearly indicate and show approved baffle type filters
- Plans shall clearly indicate if the system is single or tandem.
- Plans shall clearly indicate and show the location of the K class portable fire extinguisher.
- Plans shall clearly indicate the complete name and address of the premises where the system is being installed.
- Plans shall be reviewed and sealed by a New Mexico Registered Professional Engineer, as outlined on Page 4, or the plans will be denied.

System Annunciation

Upon activation of the commercial kitchen hood extinguishing system and audible alarm or visual indicator shall be provided to show that the system has activated. Where a fire alarm signaling system is serving the building where the extinguishing system is located, the activation of the automatic fire-extinguishing system shall activate the fire alarm signaling system.

Clean agent fire suppression systems

The following requirements shall apply to all projects for clean agent for suppressions systems which include but not limited to FM 200, ECARO, and INERGEN fire suppression systems.

Construction documents for clean agent fire suppression systems shall be of sufficient clarity to indicate the location, nature, and extent of the proposed work, and show in detail that it will conform to the provisions of the Bernalillo County Fire Code, the International Fire Code and the appropriate NFPA standard.

Construction documents for clean agent fire suppression systems shall be submitted for review and approval prior to installation. Clean agent fire suppression systems shall be designed in accordance with NFPA 2001 and shall be submitted bearing a review certificate and signature of a New Mexico Licensed Engineer as outlined in NMAC Title 16 Chapter 39 Part III subsection G "Fire Protection Engineers". The Commercial Kitchen Hood Contractor shall forward the Engineer's comments, with the appropriate changes to the Bernalillo County Fire Marshal's Office at the time of initial submittal

General Information Required

Plans or shop drawings and calculations shall be submitted for approval to the Bernalillo County Fire Marshal's Office before installation or remodeling begins. Plans or shop drawings shall be prepared only by persons fully experienced and qualified in the design of total flooding and local application clean agent fire extinguishing systems. Plans and shop drawings shall be drawn to an indicated scale. The following is the minimum requirements for submittal of clean agent fire suppression systems.

- Plans shall clearly indicate the name of the owner/occupant
- Plans shall clearly indicate the address of the property being protected
- Plans shall clearly indicate the Fire Protection Contractor information
 - Name of Company installing the system
 - Complete Contractor address

Plans Review and Submittal Requirements

- Telephone contact information
 - Name of designer, and NICET certification information.
- Plans shall clearly indicate and show a sectional view of the room with floor and ceiling assemblies and isometric view of the system
- Plans shall clearly indicate and show a floor plan and isometric detail of the agent distribution system including
 - Calculation reference points
 - Pipe diameters
 - Pipe lengths
 - Equivalent length of fittings
 - Device and nozzle locations and positions
- Plans shall clearly indicate the sequence of operation for the clean agent system
- Plans shall clearly indicate the methods for installation of detectors, fire detections devices, alarm signaling devices, and selected wiring practices.
- Plans shall clearly indicate the location of wire runs for automatic detection equipment, showing tie-in to the suppression system panel, and tie-in to the main building fire alarm panel.
- Plans shall provide calculations for clean agent serving the enclosed volume, the backup power duration and the voltage drop for the number of installed alarm initiating and alarm signaling devices.
- Plans shall clearly indicate the location of agent storage tanks, including the size and capacity of agent for each storage tank.
- Plans shall provide a diagram of the system riser
- Plans shall provide a primary and secondary source of power to the control unit.
- Plans shall clearly indicate that the main power supply for the system is on a dedicated branch circuit and properly labeled.
- Plans shall clearly indicate the type of system (flooding or local application) type of agent (halocarbon or inert gas)
- Plans shall clearly indicate the nozzle flow rate, orifice size gas temperature, gas quantity, and the volume of the area protected.
- Plans shall clearly indicate the location of manual activation devices, and abort switches to include wire runs
- Plans shall be reviewed and sealed by a New Mexico Registered Professional Engineer, as outlined on Page 4, or the plans will be denied.

System Annunciation

Upon activation of the clean agent suppression system and audible alarm or visual indicator shall be provided to show that the system has activated. Where a fire alarm signaling system is serving the building where the extinguishing system is located, the activation of the automatic fire-extinguishing system shall activate the fire alarm signaling system. All Audio/Visual Equipment which is primarily dedicated to the clean agent system shall differ in color from the building fire alarm system.

Deviations, additions, or deletions from original plans

Any deviations, additions, or deletions from submitted shop drawings (i.e. removal, relocation, or addition of devices) that have not been approved prior to any changes being made will result in failure of system, and occupancy of the building covered by the system. Additionally, a re-submittal of shop drawings will be required. Re-submitted drawings shall indicate any and all device removals, additions or deviations.

Before requesting final approval of the installation, where required by the fire code official, the installing contractor shall furnish a written statement to the fire code official that the subject fire protection system has been installed in accordance with approved plans and has been tested in accordance with the manufacturer's specifications and the appropriate installation standard. Any deviations from the design standards shall be noted and copies of the approvals for such deviations shall be attached to the written statement.